sity, the laboratory from the first has been under the control of the Fishery Board for Scotland, who administered the Parliamentary grant given in 1884 for its equipment, and who maintain the attendant and defray certain other expenses.

Ample space exists for the formation of large external ponds and tanks, and certain portions of the tidal rocks in the neighbourhood are fitted for enclosure, so that young fishes and crustaceans may be reared from the post-larval stages onward, under conditions as closely approaching nature as possible. In the same way the culture of useful mollusks can be experimented with.

The beach at St. Andrews is remarkably adapted for marine researches, since it combines extensive reaches of sand with their special forms, and on which a vast variety of materials in a fresh state are stranded by storms, with great stretches of tidal rocks and rock-pools so rich in littoral animals and plants. The valuable mussel-bed in the estuary of the Eden, the proximity of the Forth and the Tay, the constant stream of specimens brought by the fishing-boats, and the plenitude of life in the bay itself—all combine to render it classic ground to the naturalist. For example, amongst the rarer forms at St. Andrews are *Corymorpha*, *Cerianthus*, *Pennatula*, *Asterias Mülleri*, *Echiurus*, *Magelona*, *Tornaria Mitraria*, swarms of Appendicularians (*Oikopleura*), *Pelonaia*, *Actinotrocha*, the Pteropods *Clione* and *Spirialis*, the Nudibranch *Idalia*, and the Tectibranch *Aplysia*.

The greatly improved facilities for research which the munificence of Dr. Gatty has granted to St. Andrews cannot but increase the results in regard to marine biological science and the fisheries, and render the old University city even better known in this connection in the future than in the past. Yet there are those still living who remember the glee of Edward Forbes as he picked up the living spoon-worms (*Echiuri*) on the west sands, and who listened to a short course of lectures he gave in the University on star-fishes, before the publication of his work on this group, and who were familar with the figure of John Reid as he descended the steps at the Baths to hunt for *Hydra tuba*, and watch the scyphistoma-stage of *Aurelia*, which he independently worked out there. It is unnecessary on the present occasion to allude to the names of more recent workers, but they are many, and include continental and American, as well as those of our own country. W. C. M.

NOTES.

ALL who take an interest in science will be glad to hear that the health of Prof. von Helmholtz has been improving of late, and that he has regained partial use of his paralysed side.

THE resignation of Prof. Dana, from the position he has so long occupied at Yale University, is announced. Dr. Dana was appointed, in 1850, Silliman Professor of Natural History and Geology at Yale, and now at the age of eighty-one years he is compelled to abandon further active work by reason of feeble health. We hope that many years of well-earned rest remain to him.

PROF. H. S. WILLIAMS, formerly of Cornell University, has been appointed Prof. Dana's successor at Yale University.

THE sixty-second annual meeting of the British Medical Association will take place at Bristol, from July 31 to August 3, under the presidency of Dr. E. Long Fox. The report which the council has to present is, we understand, a very favourable one, and shows that the membership of the Association has increased from 14,703 to 15,090, and the total investments to £41,789. Dr. Long Fox is to deliver his address on Tuesday, July 31, and during the meeting the following addresses will be delivered:—On Medicine, by Prof. Sir T. Grainger Stewart; on Surgery, by Prof. Greig Smith; and on Public Medicine, by Sir Charles Cameron.

THE Société Industrielle de Mulhouse has issued a programme of the prizes to be awarded next year. The prizes are open to all, whether natives of France or not, and works competing for them must reach the President of the Society before February 15, 1895. Most of the awards consist of medals only, but some carry with them prizes varying from one hundred to five thousand francs. A complete programme can be obtained by applying to the Secretary of the Society, Mulhouse.

THE twenty-third meeting of the French Association for the Advancement of Science will be opened at Caen on August 9, under the presidency of Prof. Mascart. The work of the Association will be divided into four groups, each containing from three to five sections. The first group (Sciences Mathématiques) will be devoted to mathematics, astronomy, and geodesy, mechanics, navigation, civil and military engineering. To Group II. (Sciences Physiques et Chimiques) belong physics, chemistry, meteorology, and terrestrial physics. In the third group (Sciences Naturelles et Médicales) will be found geology and mineralogy, botany, zoology, anatomy, physiology, anthropology, and medical sciences. The fourth group (Sciences Économiques) is concerned with agriculture, geography, political economy and statistics, pedagogy, hygiene, and public health.

THE next annual meeting of the Italian Botanical Society will take place at Palermo, in 1895. For the present year a botanical excursion is arranged, on September 25 and the three following days, to the Island of Giglio, the largest of the Tuscan Archipelago, except Elba, the flora of which has been but imperfectly explored. Botanists desirous of taking part in the expedition should communicate, not later than September 15, with the President, Prof. Arcangeli, 19 Via Romana, Florence.

INFORMATION has come to hand respecting an International Exhibition of Arts, Industries, &c., which is to be held at Bordeaux in 1895. The exhibition, which is the thirteenth held at Bordeaux, will be opened on May 1, and will be divided into some ten Sections, as follows:—Section I. Education. II. Arts (Liberal, Industrial, and Decorative; Medicine, Hygiene, &c.). III. Social Sciences. IV. Agriculture, Horticulture. V. Wines and Spirits. VI. Industries (Mineralogical, Mechanical, Chemical, &c.). VII. Habitation (Furniture, Dress, &c.). VIII. Transport, Civil Engineering, and Military Art. IX. Electricity. X. Commerce and Colonies. England, Belgium, Italy, Portugal, Spain, and Switzerland are invited to contribute.

THE seventeenth annual meeting of the Midland Union of Natural History and Scientific Societies will take place on August 3 and 4, at Ellesmere, under the auspices of the Ellesmere Natural History Society and Field Club. A strong programme has been arranged, and after the business meetings of August 3 a conversazione will be held at St. Oswald's College. The following day will be taken up by three excursions: one to Chirk, Llangollen, and Valle Crucis for the archæologists, led by Mr. A. T. Jebb; a second, round the Meres and Peat Mosses of the neighbourhood for the biologists, under the leadership of Messrs. Peake, Jennings, and Thompson. The third, for the geologists, will be under the guidance of Dr. Callaway, who will conduct his party to Hawkstone and Grinshill. We understand that the Ellesmere Society hope that many of the visitors will be able to stay in the neighbourhood over the Bank-holiday, when further excursions may be arranged, and they are perfecting the arrangements in a most generous and hospitable spirit.

WE hear, with much regret, of the death, at the age of seventy-nine years, of Dr. Daniel Cornelius Danielssen, who has been since 1864 president of the Directors of the Bergen Museum, and of Prof. Michele Lessona, President of the Royal Academy of Science at Turin.

The death is announced of Mr. Alfred Williams, who for many years has been closely identified with the branch of his profession relating to gas engineering. Mr. Williams was one of the founders of the Society of Engineers, and has acted as its honorary secretary and treasurer since its inauguration in 1854.

The Accademià dei Lincei at Rome held its annual meeting on June 3, the President, Senator Brioschi, being in the chair. The King of Italy always attends these meetings, and this year the Queen accompanied him. The magnificent Palazzo Corsini, which compares with the rooms of the Royal Society very much as the consideration shown to men of science in Italy does with the neglect of science by the powers that be in England, was *en fête*, and the sitting, already recorded at length in the *Atti*, was a most interesting one. The President referred to the work done by the Society, and the constant sympathy of the King with its affairs; and Prof. Ferraris, of the Turin Industrial Museum, gave a discourse on the electric transmission of energy.

We have often in these columns had to complain of the backwardness of the Government of this country to recognise the value of men of science and the work in which they are engaged, and a fresh instance of this slowness of vision is furnished in a recent number of the *Electrical Review*. It seems that of the deputations sent last year to the International Congress at Chicago, the delegates who represented France and Germany had the whole of their expenses paid, and were rewarded according to their several merits with decorations, honours, and with courteous thanks. The representatives of Great Britain alone have been ignored entirely: and, so far from their services receiving remuneration or thanks, it is doubtful whether her Majesty's Government even know the names of those who looked after British interests and maintained the credit of Britain on this most important occasion. Yet they were all men of the highest eminence, who sacrificed much time and trouble to this thankless business. According to our contemporary, among them was one whose labours have been rewarded abroad with every kind of honour and acclaim, whose work has wrought incalculable benefit, whose inventions are in constant universal use, who gave his greatest discovery freely to the world—and who has never in his own country received the smallest official recognition or distinction. Truly, a prophet is not without honour save in his own country and among his own people.

Some sensational paragraphs have appeared in evening papers as to all hope of the Wellman arctic expedition being abandoned; but this is not the case. There is serious cause for anxiety, but the probability that Mr. Wellman had left the *Ragnvald Jarl* before she was lost, is at least as great as that he was on board at the time. During the next month there will be frequent communication with Spitzbergen, and the position of Mr. Oyen on Danes Island will not be one of utter desolation. Colonel Feilden writes to the *Times* from Lerwick on July 21, correcting some of the extravagant rumours which had been published. He states that none of Mr. Wellman's party had any previous experience of Arctic work, and that the conduct of the expedition, so far as known, showed ignorance of the risks they would have to run.

The American Museum of Natural History have commissioned Prof. Rudolph Weber to organise an expedition to Sumatra, for the purpose of scientific exploration and the collection of specimens. Mr. Weber will leave New York on the 28th inst., and will study for a short time in Germany, thence proceeding to Sumatra, where he will collect and equip a force of natives for the expedition.

With reference to the note in our last number, respecting the Rev. S. A. Thompson Yates's gift to the University College, Liverpool, a correspondent writes:—"The Thompson Yates Laboratories are to be exclusively devoted to physiology and pathology; and since of no two subjects can it be said with more truth that "aliud ex alio clarescet," it is to be hoped that both will largely benefit by the fact of their being housed in the same building. Many of the requirements are identical, so that the proposed new laboratories, whilst providing the separate accommodation for such teaching and research as the study of the subjects requires, will be as far as practicable dovetailed, so as to avoid the reduplication of costly special rooms. It is hoped that such combined laboratories may prove of value by bringing into intimate association pathological and physiological scientific workers, and it is certain that a building complete in itself, which provides for both departments, must lend itself most advantageously to economical maintenance. The building will be situated in the ample grounds of the College, and will form a block to which, at some subsequent date, the Medical faculty hopes to add further new buildings for other departments of its Medical School."

By permission of the postal authorities, the wires between St. Margaret's and the General Post Office, London, were, on Sunday afternoon and evening last, used for the purpose of some experiments with the teleautograph, the invention of Prof. Gray, of New York; the time for the experiments being selected owing to the wires being comparatively idle on Sundays. The experiments took place between the General Post Office, London, and Cable Hut, St. Margaret's Bay, through which the London and Paris telephone passes. Special instruments were fixed up at both ends, and as this was the first time that long distance experiments in teleautography have taken place in this country, they were watched with unusual interest. The results were excellent, the messages transmitted being in every respect most successful, and the instruments working without the slightest hitch over a distance of 83 miles. Messages were both sent from and received at St. Margaret's Bay. The principle of the instrument is that it automatically records an exact *fac-simile* of the writing contained in messages. In the experiments on Sunday the receiving pencil recorded with ease and clearness different handwritings, giving thick and thin strokes, dotting i's, and crossing t's very correctly.

The current number of the *British Medical Journal*, in a leader on "Cholera Prospects," laments the fact that "there are half-a-hundred places in England where, if cholera were to be introduced to-morrow, it would, unless at once detected, spread, and not only so, but spread to the danger of communities around, and which, by reason of gathering grounds of their water supply, or the like, are at the mercy of some rural body whose sole aim as a body seems to be to cut down the rates at the expense of the public health." The outlook, as far as this country is concerned, is not of the brightest, and health bodies would certainly do well to take to heart the advice of our contemporary, and bestir themselves betimes to the proper fulfilment of the duties devolving upon them.

Confirmation of the wisdom of the old adage, "There is nothing new under the sun," is to be found in the *Lancet* for July 21, which details from the "Newes" of 1665 a series of precautions employed in combating the plague of London in that year. "These include the appointment of parochial examiners to investigate cases of sickness and to take measures for their isolation if needful and the employment of watchmen to ensure this result and of chirurgeons to certify the presence of plague. Notification of this disease was the duty of householders; every infected house was marked in the manner with which we are all familiar and underwent a quarantine of longer or shorter duration, and disinfection was carried out by airing with fire and by medicated fumigation. Nurses on the termination of a case were subject to twenty-eight days' seclusion, and visitors were forbidden the house of sickness." We of to-day could do worse than act upon much of the advice here given.

IN the report of the Puffin Island Biological Station, just received, we find a history of the station since its vacation by the Liverpool Biological Society for their new home at Port Erin. The laboratory was taken over in 1892 by a number of members of the staff of University College, Bangor, and other residents in the neighbourhood; and a committee of management was formed, with Mr. P. J. White, who also edits the report, as director of the station. The contributors to the present report of thirty-two pages deal briefly with special points of interest in the terrestrial fauna and flora and the archæology of the island, and the director offers some suggestions in regard to the improvement of the sea-fisheries (shell-fish) of the district.

THE *Compte Rendu* of the fifth session of the International Geological Congress, held at Washington in 1891, has just appeared. The general arrangement of the book closely follows that of the report of the London Congress (1888), but it is printed on larger paper. The formal reports of discussions, &c., are printed in French, but these occupy only a small portion of the book; the greater part consists of descriptive papers and of fuller reports of some discussions, mainly in English. The description, by C. R. van Hise, of the pre-Cambrian rocks of the Lake Superior region, and the geological guide-book to the Rocky Mountain Excursion, edited by S. F. Emmons, are interesting portions of the report. Some notes and sketches by "visiting geologists"—Prof. T. McK. Hughes and Dr. Fr. Frech—are appended. We may also here note that Dr. F. Wahnschaffe has published detailed descriptions of the Western districts in *Naturwissenschaftliche Wochenschrift*. The Rocky Mountain Guide-book is by numerous contributors, and we have received a separate copy of that part relating to the Yellowstone Park, by A. Hague.

WE have received part i. of the twelfth annual report of the Fishery Board for Scotland, being for the year 1893. Following the practice of previous years, the report will be issued in three parts. The third part deals with the scientific investigations conducted under the direction of the Board, and in it the hatchery established at Dunbar for the propagation of marine food-fishes will be described. We learn from the present part that the establishment consists of a small tidal pond, in which a limited number of spawning fishes may be collected and preserved; a large concrete spawning tank, in which the fishes at maturity are placed; a chamber for the automatic collection of the fish eggs, and for the filtration of the water; a hatching room, in which the special hatching apparatus is fitted up; together with the necessary pumping apparatus. The whole of the expenditure, amounting to about £1600, has been met from the ordinary vote for scientific investigations. So far, the operations have been limited by the want of a sufficiently capacious sea-water enclosure. Nevertheless, over 25,000,000 eggs of the plaice have been hatched in the establishment, and arrangements are in progress with the view of obtaining a supply of adult turbot and soles, so as to admit of these fishes being propagated on a large scale, and the fry placed on the fishing grounds. The opinion is expressed that when large sea-water ponds or enclosures are added, it will be possible to retain the young flat fish until they have assumed the habits of the adults, and thus greatly increase the usefulness of the establishment to the fishing industry.

A REPORT on the cultivable land on Kilimanjaro, with special regard to its climate and healthfulness, is published by Dr. Brehme in the last number of the *Mittheilungen aus Deutschen Schutzgebieten*. The fertile land may be taken as the zone between 3700 and 7000 feet of elevation; this zone, strictly speaking, measures only 500 square miles, but several thousand square miles of the neighbouring country may be included as fit for settlement. The soil is the result of the weathering of volcanic rocks mixed with the humus formed by decaying vegetation; it is from 1 to 3 metres thick on the lower slopes, and of great natural fertility. The water supply is good, from melting snow, as well as from the discharge of the clouds which usually hang over the upper part of the mountain. Rains or wet mists occur frequently at all times of the year. The healthfulness of the slopes watered by rapid streams is in contrast with the fever-haunted marshes of the plain at the base of the mountain, where the slope of the land is insufficient for natural drainage. One very important circumstance is that the water of the mountain streams may be drunk unboiled without any risk. At the station of Marangu (1430 metres), meteorological observations, taken from October 1892 to December 1893, the highest monthly mean temperature at 7 a.m. was 17°·9 C. in December 1892, and the lowest 13° C. in August 1893. The mountain is exposed to the trade winds, the south-east trade blowing from April to October, and the north-east from the end of October to March; but the local winds are modified by a general up-hill wind during the day-time, and a down-hill wind at night. The illnesses most common on the cultivable zone of the mountain are much more frequently due to cold than to malaria. In addition to the banana, sorghum, and maize, all European cereals and vegetables grow readily. There seems to be no reason why the experiment of settling European farmers on the temperate uplands of the mountain should be unsuccessful if fairly tried.

IN the last number of the *Scottish Geographical Magazine*, Prof. Otto Pettersson continues his memoir on recent Swedish hydrographic research in the Baltic and North Seas. In this instalment, which is profusely illustrated with coloured charts and sections, he shows how the observations have thrown new light on the Baltic Current in the Skagerack and North Sea. The outflowing and inflowing currents which traverse the Skagerack can readily be distinguished by the different salinity of the water, the inflowing current containing more than 3·2 per cent. and the outflowing less than 3·0 per cent. of salt. In winter, when the outflowing current, or Baltic Stream, is reduced to its minimum by the freezing of the rivers, it shrinks to the dimensions of a narrow current along the coast, the Skagerack resembling a whirlpool with still water in the middle, and the moving water flowing along the coasts. The water is everywhere warmer than the air, but most so in the centre. Thus, while the air at or below 0° C. is in contact with water of nearly the same temperature off the Swedish coast, in the centre of the Skagerack it rests on water the surface temperature of which may be as much as 5°; thus a central mass of relatively warm air is produced, surrounded by concentric layers which are colder and colder. This not only affects the climate of the Swedish coast, but is favourable to the formation or attraction of cyclones. In spring the cold Baltic Stream overspreads the warm central waters of the Skagerack with a fresher and colder layer, destroying the conditions favouring the formation or passage of cyclones, and thus produces the typical dry and cold spring weather which prevails in Sweden.

IN a letter to the *Electrician*, Prof. Elihu Thomson mentions a curious and rather amusing illustration of the principle upon which the instrument for detecting the presence of electric oscillations, devised by Prof. Oliver Lodge, and called by him the "coherer," is based, which came under his notice lately. It will be remembered that the "coherer" depends on its action on the alteration in the resistance of a "bad contact" between an aluminium plate and an iron wire when electric oscillations are set up in the circuit containing the coherer. It was reported to Prof. Thomson that a certain electro-plater at Philadelphia had found that he could not pursue his silver-plating operations during a thunderstorm, and that if he left his plating over-night, and a thunderstorm came on, the work was invariably ruined. Prof. Thomson says:—"I was disposed to be thoroughly sceptical, and expressed my disbelief in any such effect. Being urged, however, I went to the silver-plater's shop, which was a small one, and questioned the silver-plater himself concerning the circumstances which had been reported. While it was evident that he was not a man who had informed himself electrically, I could not doubt that he had indeed stated what was perfectly true, namely, that when his plating operations were going on and a thunderstorm arose, his batteries, which were Smee cells, acted as though they were short-circuited, and the deposit of metal was made at too rapid a rate. The secret came out on an inspection of his connections. The connections of his batteries to his baths were made through a number of bad contacts, which would not fail to be of high resistance under ordinary conditions. I could readily see that virtually he was working through a considerable resistance, and that he had an excess of battery power for the work. Under these circumstances a flash of lightning would cause coherence of his badly-contacting surfaces, and would improve the conductivity so as to cause an excessive flow of current, and give a too rapid deposit. The incident suggests the employment of Dr. Lodge's ingenious instrument in the study of the waves which are propagated during thunderstorms, of which waves we have practically little or no information."

PROF. R. LEPSIUS, of Darmstadt, is preparing a new geological map of Germany, which will give a valuable summary of our knowledge of that area. It is founded upon the various national surveys and upon other good authorities. The scale is 1 : 500,000. The map will be complete in twenty-seven sheets, each measuring 15¾ inches by 13 inches. Four sheets in the south-western areas are published (by J. Perthes, Gotha); these are:—Sheets 17, Köln; 22, Strassburg; 23, Stuttgart; 25, Mülhausen. The sheets are completed beyond the German boundary. The meridian of the map is Paris, but the longitude east of Greenwich is also indicated on the upper margin of each sheet. A new point in this map is that a complete index is printed with each sheet, but only those rock-divisions indicated on the sheet are coloured. The subdivisions shown may be grouped as follows:—Post-Tertiary, 4; Tertiary, 4; Secondary, 11; Palæozoic, 10; Metamorphic, 2; Volcanic and Plutonic, 7. The "Silur System" includes Cambrian, Lower Silurian, and Upper Silurian. The map is unusually bright and clear; this is partly due to the black printing (topography, &c.) having been done last, over the colours. Like many other geological maps recently published, the price is small: two marks for one sheet, or three marks for each Lieferung containing two sheets.

THE generous manner in which reports on scientific matters are prepared and published in the United States has frequently been commented upon in these columns. In 1891 the sum of two thousand dollars was voted by Congress for investigations respecting the advisability of establishing a fish-hatching station in the Rocky Mountain region in the States of Montana and Wyoming, and also a station in the Gulf States. The results of these investigations are contained in a *Bulletin* (vol. xi. 1891) recently received from the U.S. Fish Commission. Prof. B. W. Evermann carried out the chief of the investigations. In looking for a suitable site for a fish-cultural station, the following requirements for the successful operation of such a station were kept in mind:—(1) There should be a constant supply of not less than one thousand gallons a minute, at a temperature never exceeding 50° or 55°, and free from any possibility of contamination. (2) There should be twenty to thirty acres of ground conveniently near the source of water supply. There should also be sufficient fall between the source of water supply and the hatchery building to permit a gravity supply. (3) The location should be central with reference to the region to be stocked, and should also afford good railroad facilities. Prof. Evermann and his party visited fourteen of the most promising localities, and the explorations were very satisfactory, both from the economic and scientific points of view. It was eventually decided that the region most nearly filling all the natural requirements was Horsethief Springs. These springs, situated in Montana, near the north-west corner of the Yellowstone National Park, are among the largest and most remarkable to be found anywhere in the United States.

WE are glad to see, from the "Abstract of Proceedings of the South London Entomological and Natural History Society" for the years 1892 and 1893, which has just reached us, that the condition of the Society is still a very satisfactory one, although the membership is slightly lower now than a year ago. The Society now numbers 192 members. The volume contains, in addition to reports of the various meetings held, the addresses of the respective presidents for 1892 and 1893.

THE London Matriculation Directory for June has just been issued by the University Correspondence College, and contains the papers set for the Matriculation Examination, June 1894, and solutions to the same.

A SECOND edition has been issued of the catalogue of the "Bibliothèque du Jardin Botanique de Buitenzorg," Java. The edition has been prepared by Dr. Brutel de la Rivière, and it is much more complete and better arranged than the first. We are requested to state that naturalists desiring to obtain a copy of the catalogue, should communicate with M. Treub, the Director of the State Botanic Garden, and the volume will be sent without delay.

THE July part of the *American Naturalist* contains, besides general notes, articles on "Animal Mechanics," by Dr. Manly Miles; "The Meaning of Tree-Life," by H. L. Clarke; "Lepidosirenids and Bdellostomids," by Theodore Gill; and "The Origin of Pelagic Life," by Prof. W. K. Brooks.

THE Quarterly Statement of the Palestine Exploration Fund for July contains many items of interest, among which we notice a translation of a paper by M. Th. Barrois, "On the Depth and Temperature of the Lake of Tiberias."

MESSRS. MACMILLAN AND CO. have just published a new edition, revised and enlarged, of "Arithmetic for Schools," by Rev. J. B. Lock.

THE Seventeenth Annual Report of the Connecticut Agricultural Experiment Station has just been issued at New Haven, and tells of a vast amount of work done during 1893.

AN interesting mode of converting oxide of iron into small but perfect crystals of hæmatite, exhibiting the characteristic forms of the naturally occurring mineral, is described by Prof. Arctowski, of Lüttich, in the current number of the *Zeitschrift für Anorganische Chemie.* The experiment simply consists in passing partially or totally dissociated ammonium chloride vapour over the oxide heated to a particular temperature. The oxide is placed in a combustion tube closed at one end, and at the closed end a quantity of ammonium chloride. The portion of the tube containing the latter is placed in a combustion furnace, and that containing the ferric oxide in an air bath, so constructed that the reaction within the tube can be observed, in order to be able to attain any desired temperature. When the ferric oxide is heated to about 600° in the stream of ammonium chloride vapour small glittering crystals commence to form after the expiration of a few minutes, the remainder of the oxide increases considerably in volume, and ammonium-chloride is rapidly absorbed. No fusion occurs, so that the absorption is a mechanical one; the ammonium chloride condenses upon the exterior of the particles, eventually converting the powder into a white mass. Upon subsequent microscopic examination of this white product large numbers of the small brilliant crystals of hæmatite are observed interspersed among the whitened particles. When the experiment is performed at 700°, the whole of the ferric oxide is converted into miniature crystals of hæmatite; it is probable that the ammonium chloride is totally dissociated at this temperature. The crystals exhibit all the peculiar crystallographic properties of hæmatite. The fundamental rhombohedron possesses the characteristic angle of 86°, and the subsidiary forms developed, including those of the scalenohedron, are precisely those exhibited by the natural mineral and are developed to about the same extent. This mode of synthesising hæmatite is very probably intimately connected with that described by M. Sainte Claire Deville in 1861. The latter method consisted in heating ferric oxide to redness in an indifferent atmosphere into which traces of hydrochloric acid gas were admitted. As the ammonium chloride in the experiment at 700° was most probably completely dissociated into hydrochloric acid and ammonia, it is extremely likely that the crystallising action was due to the free hydrochloric acid. The synthesis of hæmatite by means of partially or totally dissociated ammonium chloride vapour is interesting, however, as throwing light upon the mode of formation in nature, for the vapours evolved by the fumaroles in volcanic districts always contain a certain proportion of sal-ammoniac, and it is usually observed that the fissures through which these vapours pass are more or less covered with crystals of specular iron and hæmatite. There is every probability, therefore, that the formation of the crystals is due to the partially dissociated sal-ammoniac, just as in the artificial experiments above described.

THE additions to the Zoological Society's Gardens during the past week include a Moustache Monkey (*Cercopithecus cephus*) from West Africa, presented by Mr. Clayton Pickersgill; a Leopard (*Felis pardus*) from East Africa, presented by Mrs. J. R. W. Pigott; a Lioness (*Felis leo*) from East Africa, presented by Major Owen; two Tiger Cubs (*Felis tigris*) from Pehang, Malay Peninsula, presented by Lieut.-Colonel Sir Charles B. H. Mitchell, K.C.M.G.; a Common Jackal (*Canis aureus*) from India, presented by Mr. Gerard Gurney; a Monk Seal (*Monachus albiventer*) from Madeira, presented by Mr. C. F. R. Blandy; a Cockateel (*Calopsitta novæ-hollandiæ*) from Australia, presented by Miss Sloane Stanley; six South African Francolins (*Francolinus afer*), a Puff Adder (*Vipera arietans*) from South Africa, presented by Mr. J. E. Matcham; a Smooth Snake (*Coronella lævis*) from Hampshire, presented by Mr. Willingham F. Rawnsley; a Long-eared Fox (*Otocyon megalotis*) from Somaliland, a Geoffroy's Terrapin (*Platemys geoffroyana*) from the Argentine Republic, a Ceylonese Terrapin (*Clemmys trijuga*) from Ceylon, an Ocellated Monitor (*Varanus ocellatus*) from Lake Tanganyika, two Black and White Snakes (*Pituophis melanoleucus*) from New Jersey, U.S.A., a Black-winged Peafowl (*Pavo nigripennis*) from Cochin China, deposited; a Muscat Gazelle (*Gazella muscatensis*) from Muscat, received in exchange; two Collared Fruit Bats (*Cynonycteris collaris*), four Mandarin Ducks (*Æx galericulata*), six Australian Wild Ducks (*Anas superciliosa*), two Slender Ducks (*Anas gibberifrons*), a Magellanic Goose (*Bernicla magellanica*), a Black-headed Gull (*Larus ridibundus*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE RESULTS OF IMPRUDENT SOLAR OBSERVATIONS.—Dr. George Mackay, of the Royal Infirmary, Edinburgh, has sent us a pamphlet "On Blinding of the Retina by Direct Sunlight" (J. and A. Churchill), being a study in prognosis, based chiefly upon accidents incurred during the observation of partial solar eclipses. Tyros in observations of the sun, and also many incautious astronomers, have sustained more or less permanent injury to the sight by looking at it or its image without the interposition of a dark glass, or similar absorber, of sufficient thickness. During the progress of partial solar eclipses, the laity often make incautious observations, and the results of gratifying such curiosity have furnished Dr. Mackay with the chief part of the clinical material for his study. The paper, which originally appeared in the *Ophthalmic Review*, opens with a historical survey of the few cases of ocular injury from exposure to sunlight, recorded in historical literature. There is a tradition that Galileo seriously impaired the sight of his right eye by his solar observations, but Dr. Mackay has not been able to trace the story to its origin. It is well known that, in his later years, Galileo became quite blind, but the loss of sight was apparently caused by an affection of the cornea, and not by injury to the retina. The earliest precise description of the subjective sensations consequent upon focussing solar rays upon the retina is due to Reid, a Professor of Moral Philosophy in the University of Glasgow. He observed the transit of Venus in May 1761, without taking any precautions to modify the intensity of sunlight, and the result was that he was afflicted with metamorphosia; that is, objects appeared to him in distorted forms. Very few other cases of similar ocular injury have been described. Fortunately for Dr. Mackay, the partial eclipse of the sun in June 1890, and that of June 1891, both visible at Edinburgh, furnished him with seven new cases of "Eclipse Blinding," all of which he examined with great care, both with the ophthalmoscope and with type and colour-tests. The patients suffered from an impairment of visual acuteness, and, to most of them, dark spots appeared in their fields of vision. Sometimes these spots were fixed, and in other cases they oscillated rapidly. Dr. Mackay says that complete recovery from the injury, even in cases of only slight failure for test-type, is exceptional if investigated by sufficiently refined methods. It is pointed out that the treatment ought to be preventive: smoked and coloured glasses of the feeble shades ordinarily used by the public to view solar phenomena are quite insufficient. Experience shows that, to view the sun with impunity, even in January, it is necessary to use a glass so dark that no object illuminated by diffuse daylight is visible through it.

A NOVEL METHOD OF SOLAR OBSERVATION.—Dr. Deslandres made an important communication to the Paris Academy of Sciences on July 9. In December 1893, he suggested that separate photographs of the sun should be taken by means of the light of individual dark and bright lines in the solar spectrum. The success with which Prof. Hale has done this with the light of the K line shows that striking results may be expected from the development of the method. An ordinary photograph of the sun is mainly produced by the action, upon the sensitive plate, of the bright intervals between dark lines. Dr. Janssen's marvellous pictures of the sun are produced by using only light of high actinic power, and covering but a small region of the spectrum, to act upon his photographic plate. By carrying this principle still further, there can be no doubt that solar physics will be considerably advanced. The dark lines in the solar spectrum are only dark by contrast. Both Prof. Hale and Dr. Deslandres have shown that sun pictures can be produced by the light from them alone. Hence, by isolating a line due to any element, and using it to act upon a sensitive plate, a photograph is obtained of the layer of the sun in which that particular element predominates. Dr. Deslandres exhibited to the Paris Academy some of the photographs obtained in this way. His first results were produced by means of the light from the bright interval between two dark lines. The pictures thus obtained showed the photosphere with spots and faculæ much the same as